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Creep of a Fine-Grained, Fully-Lamellar TiAl Alloy: T.G. Nieh and J.N. Wang, Lawrence Livermore National Laboratory, Livermore, CA, C.T. Liu and V.K. Sikka, Martin Marietta Energy Systems, Oak Ridge, TN, and D. Clemens Pratt-Whitney, West Palm Beach, FL.

A fine-grained, fully-lamellar γ-TiAl (composition by atomic %: Ti-47Al-2Cr-2Nb) was processed by a powder metallurgy technique. The alloy exhibit an excellent combination of room temperature mechanical properties with a tensile strength of 1035 MPa, elongation 1.9%, and a toughness of 22 MPa$\sqrt{m}$. In addition, the alloy has a good high temperature strength, exhibiting a yield stress of 850 MPa at 800°C. It is also creep resistant. For example, at temperatures ranging from 650 to 815°C the creep rates of the alloy are approximately ten times slower than those reported from other TiAl under similar testing conditions. In this presentation, the creep properties of the alloy will be characterized and the creep mechanism will be described. The effect of microstructure, and particularly the lamellar interface and spacing, and the colony boundaries, on the creep behavior will be discussed.

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